Amendments to the Claims

This listing of claims will replace all prior versions, and listings, of claims in the application.

Listing of Claims:

1. (Currently Amended) A probe mark reading device for reading probe marks formed on electrode pads during checking of electrical characteristics of a prescribed object including a plurality of electrode pads, comprising:

an illuminating unit for illuminating the plurality of electrode pads;

a photographing unit for photographing a part of the plurality of electrode pads illuminated by the illuminating unit and outputting images obtained by photographing as electrical signals;

a photographing position changing unit for enabling photographing all the plurality of electrode pads by consecutively changing a photographing position to be photographed by the photographing unit; and

a storage unit for receiving the electrical signals from the photographing unit and saving the image obtained from the electrical signals,

wherein an image of the part of the plurality of electrode pads ~~an electrode pad~~ to be photographed is supplied to the photographing unit for just a prescribed time in which the photographing position changing unit positions the photographing position to coincide with the position of the part of the plurality of electrode pads ~~in the vicinity of the time when the electrode pad is to be photographed by the photographing unit~~.

2. (Original) The probe mark reading device of claim 1, wherein the photographing position changing unit changes the photographing position at a predefined moving speed so as to enable photographing in order of images for all of the electrode pads in such a manner as to open up a time gap of photographing time required to acquire a single image in the case of consecutive photographing by the photographing unit or longer.

3. (Currently Amended) The probe mark reading device of claim 1, wherein an image of the part of the plurality of electrode pads ~~an electrode pad~~ to be photographed by the photographing unit is provided as a result of the illuminating unit being provided with a flash emitting a flash of light for just a prescribed period of time in the vicinity of the time where ~~the electrode pad~~ the part of the plurality of electrode pads is photographed by the photographing unit.

4. (Currently Amended) The probe mark reading device of claim 1, further comprising:

a storage unit for storing layout information that is data relating to layout positions of the plurality of electrode pads; and

a trigger unit for calculating a position for the part of the plurality of electrode pads ~~the electrode pad~~ to be photographed by the photographing unit based on the layout information stored in the storage unit and enabling a photograph to be taken by the photographing unit when the photographing position changing unit positions the photographing position to coincide with the position of the part of the plurality of electrode pads ~~the photographing position coincides~~

~~using the photographing position changing unit with the position the electrode pad is to be photographed at~~.

5. (Original) The probe mark reading device of claim 1, further comprising a probe mark checking unit for determining quality of prescribed probe marks included in the image based on the image stored in the storage unit, wherein

the probe mark checking unit comprises:

an initial vector calculator for calculating an initial vector equivalent to a vector drawn from a position of a pre-registered model probe mark relating to a prescribed electrode pad selected from the plurality of electrode pads to a probe mark position formed on the prescribed electrode pad; and

a probe mark quality determination unit for determining whether or not a probe mark formed on an electrode pad different to the prescribed electrode pad is detected within a prescribed determination range including a position in the direction and distance of the initial vector from the position of the pre-registered probe mark relating to the different electrode pad.

6. (Original) The probe mark reading device of claim 5, wherein the probe mark checking unit includes a probe mark position determination unit for determining whether or not a probe mark overlaps with a prescribed region set for the vicinity of the edge of an electrode pad including the probe mark detected by the probe mark quality determination unit.

7. (Original) The probe mark reading device of claim 5, wherein the probe mark checking unit further comprises a classification header generator for generating classification

header information including information identifying each electrode pad included in the object and determination results of the probe mark quality determination unit and storing the classification header information correlating corresponding electrode pad images in the storage unit.

8. (Original) The probe mark reading device of claim 5, wherein the initial vector calculator comprises:

a detector for detecting probe marks formed by the electrical characteristic check by performing a difference operation on the images saved in the storage unit and images for the prescribed electrode pads taken in advance before checking the electrical characteristics; and

a calculator for calculating an initial vector equivalent to the vector from the position of the probe mark taken as the pre-registered model correlating to the prescribed electrode pad to the position of the probe mark detected by the detector.

9. (Original) The probe mark reading device of claim 5,

wherein the initial vector calculator calculates the initial vector based on the vector from the position of the probe mark that is the pre-registered model correlating to each of the electrode pads for four electrodes positioned in the vicinity of the corners of the object to the position of the probe mark formed on each of the electrode pads, and

the probe mark quality determination unit determines whether or not a probe mark formed on an electrode pad different to the prescribed four electrode pads is detected within a prescribed determination range including a position in the direction and distance of the initial vector from the position of the pre-registered probe mark relating to the different electrode pad.

10. (Withdrawn) A probe mark test device for checking probe marks formed on electrode pads during checking of electrical characteristics of a prescribed object including a plurality of electrode pads, comprising:

an initial vector calculator for calculating an initial vector equivalent to a vector drawn from a position of a pre-registered model probe mark relating to a prescribed electrode pad selected from the plurality of electrode pads to a position of a probe mark included in an image for the electrode pad obtained by photographing the electrode pad; and

a probe mark quality determination unit for determining whether or not a probe mark formed on an electrode pad different to the prescribed electrode pad is detected within a prescribed determination range including a position in the direction and distance of the initial vector from the position of the pre-registered probe mark relating to the different electrode pad.

11. (Currently Amended) A probe mark reading method for reading probe marks formed on electrode pads during checking of electrical characteristics of a prescribed object including a plurality of electrode pads, comprising:

an illuminating step of illuminating the plurality of electrode pads;

a photographing step of photographing a part of the plurality of electrode pads illuminated in the illuminating step and outputting images obtained by photographing as electrical signals;

an image position changing step of enabling photographing all the plurality of electrode pads by consecutively changing a photographing position to be photographed in the photographing step; and a storage step of receiving the electrical signals outputted in the photographing step and saving images obtained from the electrical signals,

wherein an image of ~~an electrode pad~~ the part of the plurality of electrode pads to be photographed in the photographing step is supplied for just a prescribed time in which the photographing position changing unit positions the photographing position to coincide with the position of the part of the plurality of electrode pads ~~in the vicinity of the time when the electrode pad is to be photographed in the photographing step~~.

12. (Original) The probe mark reading method of claim 11, wherein the photographing position changing step is such that the photographing position is changed at a predefined moving speed so as to enable photographing in order of images for all of the electrode pads in such a manner as to open up a time gap of photographing time required to acquire a single image in the case of consecutive photographing in the photographing step or longer.

13. (Currently Amended) The probe mark reading method of claim 11, wherein the illuminating step is such that an image of ~~an electrode pad~~ the part of the plurality of electrode pads to be photographed in the photographing step is supplied by generating a flash of light for just a prescribed time ~~in the vicinity of the time when the electrode pad~~ in which the part of the plurality of electrode pads is to be photographed in the photographing step.

14. (Currently Amended) The probe mark reading method of claim 11, further comprising a probe mark checking step of determining quality of prescribed probe marks included in the image based on the image stored in the storage step, wherein

the probe mark checking step comprises:

an initial vector calculating step of calculating an initial vector ~~eqivalent~~ equivalent to a vector drawn from a position of a pre-registered model probe mark relating to a prescribed electrode pad selected from the plurality of electrode pads to a probe mark position formed on the prescribed electrode pad; and

a probe mark quality determination step of determining whether or not a probe mark formed on an electrode pad different to the prescribed electrode pad is detected within a prescribed determination range including a position in the direction and distance of the initial vector from the position of the pre-registered probe mark relating to the different electrode pad.

15. (Withdrawn) A probe mark test method for checking probe marks formed on electrode pads during checking of electrical characteristics of a prescribed object including a plurality of electrode pads, comprising:

an initial vector calculating step of calculating an initial vector equivalent to a vector drawn from a position of a pre-registered model probe mark relating to a prescribed electrode pad selected from the plurality of electrode pads to a position of a probe mark including an image for the electrode pad obtained by photographing the electrode pad; and

a probe mark quality determination step of determining whether or not a probe mark formed on an electrode pad different to the prescribed electrode pad is detected within a prescribed determination range including a position in the direction and distance of the initial vector from the position of the pre-registered probe mark relating to the different electrode pad.

16. (Withdrawn) The probe mark test method of claim 15, further comprising a probe mark position determination step of determining whether or not a probe mark overlaps with a prescribed region set for the vicinity of the edge of an electrode pad including the probe mark detected by the probe mark quality determination step.

17. (Withdrawn) The probe mark test method of claim 15, further comprising a classification header generating step of generating classification header information including information identifying each electrode pad included in the object and determination results of the probe mark quality determination step and storing the classification header information correlating corresponding electrode pad images in a prescribed storage unit.

18. (Withdrawn) The probe mark test method of claim 15, wherein the initial vector calculating step comprises:

a detection step of detecting probe marks formed by the electrical characteristic check by performing a difference operation on the images and images for the prescribed electrode pads taken in advance before checking the electrical characteristics; and

a calculating step of calculating an initial vector equivalent to the vector from the position of the probe mark taken as the pre-registered model correlating to the prescribed electrode pad to the position of the probe mark detected in the detection step.

19. (Withdrawn) The probe mark test method of claim 15,

wherein the initial vector calculating step is such that the initial vector is calculated based on the vector from the position of the probe mark that is the pre-registered model correlating to each of the electrode pads for four electrodes positioned in the vicinity of the corners of the object to the position of a probe mark formed on each of the electrode pads, and

the probe mark quality determination step is such that it is determined whether or not a probe mark formed on an electrode pad different to the prescribed four electrode pads is detected within a prescribed determination range including a position in the direction and distance of the initial vector from the position of the pre-registered probe mark relating to the different electrode pad.